



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): OHTAKA et al.

Atty. Dkt.: 11-196

Serial No.: 10/673,338

Group Art Unit: 2636

Filed: September 30, 2003

Examiner: Previl, Daniel

Title: **PASSENGER DETECTING
APPARATUS FOR VEHICLE**

Patent No.: 6,937,143
Date of Patent: August 30, 2005

Commissioner for Patents
Alexandria, VA 22314

Date: April 17, 2007

Mail Stop: Certificate of Correction

SECOND REQUEST FOR CERTIFICATE OF CORRECTION

Sir:

Patentee hereby requests that the above-identified Letters Patent be corrected to include the following information in item (75) on the first page of the patent. Specifically, the name and address of the second inventor, Satoshi Goshima, Tokyo (JP), should be added in item (75) to read as follows:

Koji Ohtaka, Chiryu (JP)

Satoshi Goshima, Tokyo (JP)

Patentee also requests that the attached Certificate of Correction be attached to all copies of the Letters Patent.

Although no fee is believed due as the error occurred at U.S. PTO, authorization is hereby given to charge any fee deficiencies or credit any overpayment to Deposit Account 50-1147.

Respectfully submitted,

David G. Posz
Reg. No. 37,701

Certificate

APR 19 2007

of Correction

Posz Law Group, PLC
11240 South Lakes Drive, Suite 101
Reston, VA 20191
(703) 707-9110
Customer No. 23400

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 6,937,143
APPLICATION NO.: 10/673,338
ISSUE DATE : August 30, 2005
INVENTOR(S) : 1) Koji Ohtaka, Chiryu (JP)
 2) Satoshi Goshima, Tokyo (JP)

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page

Please correct the named inventors in item (75) of the above above-identified Letters Patent to reflect to changes below:

(75) Koji Ohtaka, Chiryu (JP)
 Satoshi Goshima, Tokyo (JP)

MAILING ADDRESS OF SENDER (Please do not use customer number below):

POSZ LAW GROUP, PLC.
12040 South Lakes Drive
Reston, Virginia 20191

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

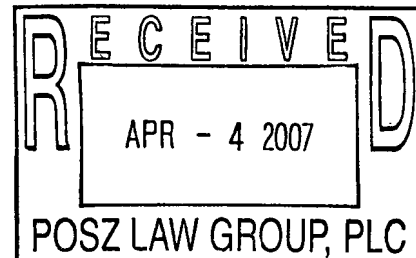


Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Date

July 10, 2004

Patent No. : 7,003,837
Inventor(s) : Jeff N. Pollard et al.
Issued : February 28, 2006
Title : COMPOSITIONS AND METHODS FOR ALTERING THE DISULFIDE
STATUS OF PROTEINS
Docket No. : 5718-119(035718/241421)



Re: Request for Certificate of Correction

Consideration has been given your request for the issuance of a certificate of correction for the above-identified patent under the provisions of 37 CFR 1.322 and/or 1.323.

Assignees' names and addresses (assignment data) printed in a patent are based *solely* on information supplied in the appropriate space for identifying the assignment data, i.e., item 3 of the Fee(s) Transmittal Form PTOL-85B. After payment of the issue fee, correction of assignment data submitted on the PTOL-85B can only be done by Certificate of Correction under 37 CFR 1.323, with a request under 37 CFR 3.81(b).

A request for a patent to be corrected to state the name of the assignee must:

- A. state that the assignment was submitted for recordation as set forth in 37 CFR 3.11 before issuance of the patent;
- B. include a request for a certificate of correction under 37 CFR 1.323 along with the fee set forth in 37 CFR 1.20(a); and
- C. include the processing fee set forth in 37 CFR 1.17(i).

If the request is granted, Certificates of Correction Branch will be notified that a Certificate of Correction may be issued.

See Manual of Patent Examining Procedure, Section 1481.01 (Rev. 3) (Oct. 2005).

Applicant has not included items A and or C above, accordingly, the request for Certificate of Correction to add or change the assignee data is dismissed.

Any request under 37 CFR 3.81(b) should be directed to the following address or facsimile number:

By mail: Mail Stop PETITIONS
Commissioner for Patents
Post Office Box 1450
Alexandria, VA 22313-1450

By hand: Customer Service Window
Mail Stop Petitions
Randolph Building
401 Dulany Street
Alexandria, VA 22314

By fax: 571-273-8300
ATTN: Office of Petitions

If a fee (currently \$100) was previously submitted for consideration of a Request for Certificate of Correction, under CFR 1.323, to correct assignment data, no additional fee is required.

Again, applicants request is denied. Any inquiry concerning this communication should be directed to Ms. A. Green at (703) 308-9380 ext. 123.



For Cecelia Newman
Decisions & Certificates
of Correction Branch

(703) 308-9390 or (703) 308-

9380 ext 123

ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Ste 4000
Charlotte, NC 28280-4000

CBN/arg

Today's Date: _____

PATENT. NO.: 6,937,143

COVER SHEET

Serial Number: 10/673,338

FOR REFUND REQUEST 10/2002/08/2005CBN)

IFW (circle if IFW)

☒ CofC request was assigned to an LIE. Dispatch/forward the file/Refund Request (use 1036) to: ARG
LIE's Initials

☐ CofC request is not assigned to an LIE, file/request dispatch To Team Leader (using 1036):

T L's Initials

Fees must be refunded if a fee is charged in error. No fees should be refunded, if consideration is given for applicants' errors, although corrections were not granted.

The person this request was assigned or Team Leader (if not assigned) must review the CofC Request and determine whether a refund is due, note why a refund is due or why a refund is not due in "Comments". LIE's seek the assistance of your Team Leader, if assistance is needed.

Check box below, if:

☐ You have determined that a refund is due. Prepare copies (stamp copies of request with account information) and complete the refund form.

After refund is completed:

- Return the file to 9200 (the File Repository), after refunding fee
- Return copy of this cover sheet and RAM printout, reflecting that a refund has been completed, to: Ernest White

Do not provide copies of any other documents, besides documents requested.

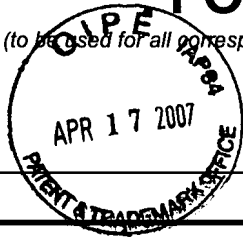
Check box below, if

☒ **If no refund is due. DO NOT DISPATCH FILE TO 9200.** Below, note one error (note col. and line or INID code) that you consider applicant's error, which required payment of fee for consideration. Also, note the document and/or the code (and its date), that contains the error, mark the page in the file (if paper a file) of the document in error, and dispatch/forward file and/or this coversheet to (Example 1: INID code (56), see the 1449 dated 04/01/2004; Example 2: col. 1, line 11, Amendment dated 04-01-04, pg. 3):

Response (see reverse side for additional comments): _____

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)



Application Number / Patent Number	10/673,338 / US 6,937,143
Filing Date / Issue Date	09/30/2003 / 08/30/2005
First Named Inventor	OHTAKA et al.
Group Art Unit	2636
Examiner Name	Previl, Daniel
Attorney Docket Number	11-196

ENCLOSURES (check all that apply)

<input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Response <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition Routing Slip (PTO/SB/69) and Accompanying Petition <input type="checkbox"/> To Convert a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Small Entity Statement	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Additional Enclosure(s) (please identify below): <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Second request for certificate of correction</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Certificate of correction</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Copy of communication mailed on July 10, 2006 (3 pages)</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Response to communication mailed on July 10, 2006 with attachments (8 pages)</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Original request for certificate of correction filed on April 18, 2006, including as-filed copies of: (1) petition to correct inventorship under 37 CFR 1.48(a); (2) supplemental declaration; (3) Statement under 37 CFR 1.48(a); (4) Statement under 37 CFR 3.73(b)</div> <div style="border: 1px solid black; padding: 2px;">Copy of original Letters Patent</div>
<input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53		Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Posz Law Group, PLC DAVID G. POSZ (Reg. No. 37,701)
Signature	
Date	April 17, 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): OHTAKA et al.

Serial No.: 10/673,338

Filed: 09/30/2003

Title: PASSENGER DETECTING
APPARATUS FOR VEHICLE



Atty. Dkt.: 11-196

Group Art Unit: 2636

Examiner: Previl, Daniel

PATENT No.: 6,937,143

DATE OF PATENT: August 30, 2005

Commissioner for Patents
Alexandria, VA 22314

Date: April 17, 2007

Mail Stop: Certificate of Correction

RESPONSE TO COMMUNICATION MAILED JULY 10, 2006

Sir:

In response to communication mailed on July 10, 2006 (copy enclosed), please note the following.

To satisfy requirement A: Notice of recordation of assignment document with reel/frame 015193/0589 is enclosed for your reference.

To satisfy requirement C: Applicant submitted a request for certificate of correction on April 18, 2006. As the error on the Letters Patent had occurred due to USPTO's mistake, no fee was enclosed. On May 1, 2006, however, Applicant's Deposit Account was charged a certificate of correction fee of \$100.00. On May 17, 2006, Applicant proceeded to file a request for refund of certificate of correction fee of \$100.00 which was refunded to Applicant's Deposit Account on July 18, 2006. Copies of May 2006 and July 2006 Deposit Account statements and a copy of request for refund are enclosed for your reference.

Based on the above information, Applicant states that all requirements listed in the communication mailed on July 10, 2006 have been met and that currently no refund is due.

Applicant respectfully requests a Certificate of Correction be issued on an expedited basis.

It is respectfully requested that unforeseen fees be charged to Deposit Account 50-1147.

Respectfully submitted,

David G. Posz
Reg. No. 37,701

Posz Law Group, PLC
12040 South Lakes Drive
Suite 101
Reston, VA 20191
(703) 707-9110
Customer No. 23400



4(m)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

SEPTEMBER 29, 2004

PTAS



102719631A

POSZ & BETHARDS, PLC
DAVID G. POSZ
11250 ROGER BACON DRIVE
SUITE 10
RESTON, VA 20190

UNITED STATES PATENT AND TRADEMARK OFFICE
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT DIVISION OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE MICROFILM COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 703-308-9723. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, ASSIGNMENT DIVISION, BOX ASSIGNMENTS, CG-4, 1213 JEFFERSON DAVIS HWY, SUITE 320, WASHINGTON, D.C. 20231.

RECORDATION DATE: 04/08/2004

REEL/FRAME: 015193/0589
NUMBER OF PAGES: 2

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).
DOCKET NUMBER: 11-196

ASSIGNOR:
GOSHIMA, SATOSHI

DOC DATE: 03/19/2004

ASSIGNEE:
DENSO CORPORATION
1-1, SHOWA-CHO
KARIYA-CITY, AICHI-PREF., JAPAN

448-8661

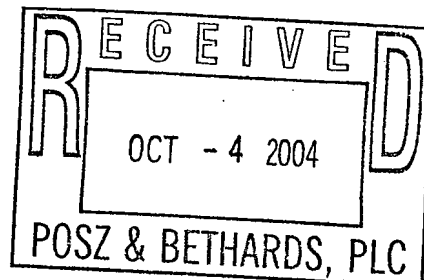
SERIAL NUMBER: 10673338

FILING DATE: 09/30/2003

PATENT NUMBER:

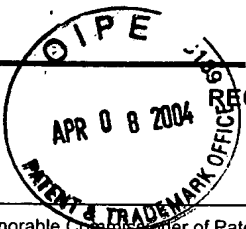
ISSUE DATE:

TITLE: PASSENGER DETECTING APPARATUS FOR VEHICLE



015193/0589 PAGE 2

SHARON LATIMER, EXAMINER
ASSIGNMENT DIVISION
OFFICE OF PUBLIC RECORDS



04-13-2004



102719631

U.S. DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office

Attorney Docket No. 11-196

To the honorable Commissioner of Patents and Trademarks: Please record the attached original documents or copy thereof.

1. Name of conveying party(ies):

(2) SATOSHI GOSHIMA

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

3. Nature of conveyance:

☒ Assignment ☐ Merger

☐ Security Agreement ☐ Change of Name

☐ Other _____

Execution Date(s): (2) March 19, 2004

2. Name and address of receiving party(ies)

Name: : DENSO CORPORATION

Street Address: 1-1, Showa-cho
Kariya-city, Aichi-pref.
448-8661 JAPAN

Additional name(s) & address(es) attached? ☐ Yes ☒ No

4. Application number(s) or patent number(s):

Month Day Year

If this document is being filed together with a new application, the execution date of the application is :

A. Patent Application No.(s)
10/673,338

B. Patent No.(s)

Additional numbers attached? ☐ Yes ☒ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: David G. Posz

Internal Address: _____

Street Address: Posz & Bethards, PLC

11250 Roger Bacon Drive, Suite 10

City: Reston State: VA Zip: 20190

6. Total number of applications and patents involved: 1

7. Total fee (37 CFR 3.41). \$ 40

☒ Enclosed

☒ Authorized to be charged to deposit account

8. Deposit account number:

50-1147

(Attach duplicate copy of this page if paying by deposit account)

DO NOT USE THIS SPACE

9. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

David G. Posz (Reg. No. 37,701)

Name of Person Signing

[Signature]
Signature

April 8, 2004

Date

Total number of pages including cover sheet, attachments, and documents: 2

Mail documents to be recorded with required cover sheet information to:
Commissioner of Patents & Trademarks, Box Assignments
Alexandria, VA 22313-1450

04/12/2004 610N11 00000068 10673338

01 FC:8021

40.00 BP

ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby expressly acknowledged, the undersigned hereby agree(s) to assign, and hereby sell(s), assign(s) and transfer(s) to

DENSO CORPORATION, 1-1, Showa-cho, Kariya-city, Aichi-pref., 448-8661 Japan

as Assignee, and its successors, assigns and legal representatives, the entire right, title and interest, in the United States of America and all foreign countries, to certain inventions known as

PASSENGER DETECTING APPARATUS FOR VEHICLE

described in an application for Letters Patent of the United States executed

(A) X on even date herewith

(B) on

(C) X as U.S. Application Serial No. 10/673,338 filed on September 30, 2003

as well as any and all continuations, divisions, and substitutes and reissues of said application for Letters Patent, and all Letters Patent that may be granted therefor. The undersigned hereby authorize(s) and request(s) the United States Commissioner of Patents and Trademarks to issue said Letters Patent to said Assignee.

The undersigned agree(s), when requested, to sign all papers, take all rightful oaths, and perform all acts which may be necessary for securing and maintaining patents for said inventions and for vesting title thereto in said Assignee.

The undersigned authorize(s) and empower(s) said Assignee to invoke and claim the benefit of the right of priority provided by the International Convention for the Protection of Industrial Property, or by any convention which may be henceforth substituted therefor, as may be necessary in connection with said application for said Letters Patent.

The undersigned also authorize(s) Posz & Bethards, PLC to insert hereon any further identification that may be necessary or desirable for recordation of this document.

Inventor 1:

Date

Witness

Satoshi Goshima
Inventor 2: **Satoshi Goshima**

March 19, 2004
Date

Kagutoshi Fukada
Witness

Inventor 3:

Date

Witness

Inventor 4:

Date

Witness

Inventor 5:

Date

Witness



United States Patent and Trademark Office

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Deposit Account Statement

Requested Statement Month: May 2006
Deposit Account Number: 501147
Name: POSZ LAW GROUP, PLC
Attention: DAVID G. POSZ
Address: 12040 SOUTH LAKES DRIVE
City: RESTON
State: VA
Zip: 20191
Country: UNITED STATES

DATE	SEQ	POSTING REF TXT	ATTORNEY DOCKET NBR	FEE CODE	AMT	BAL
05/01	3	10703596	11-204	1251	\$120.00	\$1,939.00
05/01	1	10673338	11-196	1811	\$100.00	\$1,839.00
05/01	144	10627984	26A-008	1253	\$1,020.00	\$819.00
05/02	7	10795427	01-587	1251	\$120.00	\$699.00
05/02	8	10934455	01-685	1202	\$150.00	\$549.00
05/03	32	E-REPLENISHMENT		9203	-\$2,000.00	\$2,549.00
05/03	44	10339655	01-375	1251	\$120.00	\$2,429.00
05/04	2	10383627	26AT-004-DIV	1201	\$200.00	\$2,229.00
05/04	4	11048758	01-748	1806	\$180.00	\$2,049.00
05/05	13	10994277	01-720	1251	\$120.00	\$1,929.00
05/08	10	E-REPLENISHMENT		9203	-\$500.00	\$2,429.00
05/12	107	10790211	01-562	1251	\$120.00	\$2,309.00
05/12	157	10950526	01-406-DIV	1252	\$330.00	\$1,979.00
05/15	30	E-REPLENISHMENT		9203	-\$500.00	\$2,479.00
05/15	56	10311329	26C-010-TN	1801	\$790.00	\$1,689.00
05/15	57	10311329	26C-010-TN	1253	\$1,020.00	\$669.00
05/15	1	10272832	12-024	1252	\$450.00	\$219.00
05/16	15	E-REPLENISHMENT		9203	-\$5,000.00	\$5,219.00
05/16	35	10394283	01-398	1251	\$120.00	\$5,099.00
05/16	55	11330237		8021	\$40.00	\$5,059.00
05/17	41	09833367	12-1147	1401	\$500.00	\$4,559.00
05/17	42	09833367	12-1147	1253	\$900.00	\$3,659.00
05/18	54	11007630	06-008	1253	\$1,020.00	\$2,639.00
05/19	40	E-REPLENISHMENT		9203	-\$2,500.00	\$5,139.00
05/22	1	10808543	01-625	1501	\$1,400.00	\$3,739.00
05/22	2	10808543	01-625	1504	\$300.00	\$3,439.00
05/22	3	10808543	01-625	9101	\$50.00	\$3,389.00
05/23	1	10759025	01-542	1202	-\$50.00	\$3,439.00
05/23	2	10678132	01-487	1252	-\$330.00	\$3,769.00



United States Patent and Trademark Office

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Deposit Account Statement

Requested Statement Month:

July 2006

Deposit Account Number:

501147

Name:

POSZ LAW GROUP, PLC

Attention:

DAVID G. POSZ

Address:

12040 SOUTH LAKES DRIVE

City:

RESTON

State:

VA

Zip:

20191

Country:

UNITED STATES

DATE	SEQ	POSTING REF TXT	ATTORNEY DOCKET NBR	FEE CODE	AMT	BAL
07/05	2	09944150	12-006	1251	-\$120.00	\$3,246.67
07/05	4	11180531	26A-005-CON	1814	\$130.00	\$3,116.67
07/06	1	10272832	12-024	1252	-\$450.00	\$3,566.67
07/06	2	10272832	12-024	1252	\$330.00	\$3,236.67
07/06	118	11167265	01-935	1201	\$800.00	\$2,436.67
07/07	232	10662368	01-241-DIV	1252	\$450.00	\$1,986.67
07/10	8	10546219		9204	-\$100.00	\$2,086.67
07/10	46	E-REPLENISHMENT		9203	-\$3,000.00	\$5,086.67
07/11	32	10784200	15-047	1251	\$120.00	\$4,966.67
07/11	55	10606863	11-165	1251	\$120.00	\$4,846.67
07/11	115	10272832	12-024	1402	\$500.00	\$4,346.67
07/11	102	09936712	VX012357 PCT	1251	\$120.00	\$4,226.67
07/12	18	10780893		9204	-\$1,520.00	\$5,746.67
07/17	10	10950561	12-046-TB	1251	\$120.00	\$5,626.67
07/18	10	10673338	11-196	1811	-\$100.00	\$5,726.67
07/19	86	10771636	01-548	1253	\$1,020.00	\$4,706.67
07/19	102	7055639	01-462	1464	\$130.00	\$4,576.67
07/19	263	7072180		8013	\$25.00	\$4,551.67
07/20	58	5820803		8021	\$40.00	\$4,511.67
07/20	1904	76628480	527-004	7004	\$150.00	\$4,361.67
07/21	54	10972475	01-712	1251	\$120.00	\$4,241.67
07/21	156	10681253		8021	\$40.00	\$4,201.67
07/21	157	10714905		8021	\$40.00	\$4,161.67
07/21	158	10714933		8021	\$40.00	\$4,121.67
07/21	159	10730939		8021	\$40.00	\$4,081.67
07/21	160	10766470		8021	\$40.00	\$4,041.67
07/24	70	10800723	01-575	1251	\$120.00	\$3,921.67
07/25	121	10305066	XSI.037	1253	\$1,020.00	\$2,901.67
07/25	1	10673276	26E-003	1801	\$790.00	\$2,111.67

POSZ LAW GROUP, PLC

ATTORNEYS AT LAW

12040 SOUTH LAKES DRIVE, SUITE 101
RESTON, VA 20191

SPECIALIZING IN PATENTS, TRADEMARKS & COPYRIGHTS

TEL: (703) 707-9110
FAX: (703) 707-9112
WWW.POSZLAW.COM

DAVID G. POSZ
JAMES E. BARLOW *
BRIAN C. ALTMILLER
ROBERT L. SCOTT, II
CYNTHIA K. NICHOLSON
R. EUGENE VARDELL, JR.*
THERESE B. VARDELL*
KERRY S. CULPEPPER

DEBRA G. SHOEMAKER, PH.D.**

* NOT ADMITTED IN VIRGINIA
PRACTICE LIMITED TO FEDERAL PATENT,
TRADEMARK AND COPYRIGHT MATTERS
** PATENT AGENT

FACSIMILE TRANSMISSION

Date: May 17, 2006

Pages: 11

To: **U.S. Patent Office -**

From: David G. Posz

Office of Finance - Refund Branch

Fax No.: 571-273-6500

Subject: **Request for Refund of PTO Certificate Correction Fee**



Applicant(s): OHTAKA et al.

Application No.: 10/673,338

Filed: September 30, 2003

Title: PASSENGER DETECTING
APPARATUS FOR VEHICLE

Issued on August 30, 2005
Patent No. 6,937,143

Attorney Docket No.: 11-196
Group Art Unit: 2636

Examiner: PREVIL, DANIEL

Sirs,

Applicants request a refund to Deposit Account 50-1147 of the PTO fee of \$100 for the Certificate of Correction which was charged to our Deposit Account 50-1147 on May 1, 2006. As Applicants requested the correction because the missing items in the issued patent was due to PTO's mistake.

Copies of the Request for Certificate of Correction of April 18, 2006 with related papers and our Deposit Account Statement of May, 2006 are attached herewith.

Authorization is hereby given to charge any fee deficiencies or credit any overpayment to Deposit Account 50-1147.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "D. Posz".

David G. Posz
Reg. No. 37,701

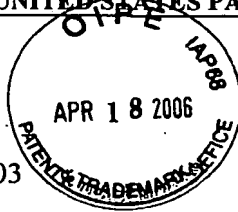
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): OHTAKA

Serial No.: 10/673,338

Filed: September 30, 2003

Title: **PASSENGER DETECTING
APPARATUS FOR VEHICLE**



Atty. Dkt.: 11-196

Group Art Unit: 2636

Examiner: PREVIL, Daniel

Patent No.: 6,937,143 **B2**
Issued: August 30, 2005

Commissioner for Patents
Arlington, VA 22202
Mail Stop: Certificate of Corrections

Date: April 18, 2006

Certificate

APR 20 2006

of Correction

REQUEST FOR CERTIFICATE OF CORRECTION

Sir:

Patentee hereby requests that the above-identified Letters Patent be corrected to include the following information in item (75) on the first page of the patent. Specifically, the name and address of the second inventor, Satoshi Goshima, Tokyo (JP), should be added in item (75).

Patentee also requests that the attached Certificate of Correction be attached to all copies of the Letters Patent.

Copies of a Petition to Correct Inventorship, a Supplemental Declaration/Power Attorney, a Statement Under 37 CFR 1.48(a)(2), a Statement Under 37 CFR 3.73(b), a Recordation Form Cover Sheet and an Assignment, that were filed on April 8, 2004, are enclosed as proof that Mr. Goshima was added as an inventor. Also, an OIPE date-stamped postcard indicating that the documents were received by the U.S. PTO on April 18, 2004 is also enclosed.

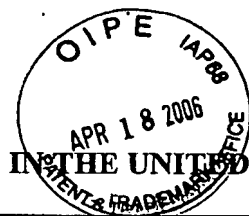
Although no fee is believed due as the error occurred at U.S. PTO, authorization is hereby given to charge any fee deficiencies or credit any overpayment to Deposit Account 50-1147.

Respectfully submitted,

David G. Posz
Reg. No. 37,701

Posz Law Group, PLC
11240 South Lakes Drive, Suite 101
Reston, VA 20191
(703) 707-9110
Customer No. 23400

APR 21 2006



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): OHTAKA et al.	Atty. Docket: 11-196
Serial No.: 10/673,338	Group Art Unit: 2632
Filed: September 30, 2003	Examiner: TBD
Title: PASSENGER DETECTING APPARATUS FOR VEHICLE	

Date: April 8, 2004

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Mail Stop: Petition

PETITION TO CORRECT INVENTORSHIP UNDER 37 CFR 1.48(a)

Sir:

This petition is being filed pursuant to 37 C.F.R. §1.48(a) to correct the inventorship of the above-identified application.

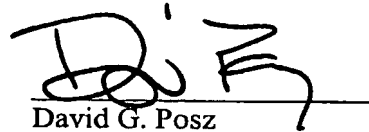
In particular, pursuant to 37 C.F.R. 1.48(a)(1), it is submitted that the inventorship originally set forth in the executed declaration signed by claimed inventor Koji Ohtaka dated September 22, 2003 was incomplete, and that the addition of second inventor Satoshi Goshima is necessary in order to accurately reflect the inventorship of the subject matter being claimed.

The error in inventorship occurred without deceptive intent by Mr. Goshima. A Statement Under Rule 1.48(a)(2) executed by Mr. Goshima that evidences his lack of deceptive intent in being initially omitted as a named inventor, as well as a Supplemental Declaration executed by both inventors pursuant to 37 C.F.R. 1.48(a)(3), are included with this Petition.

In addition, pursuant to 37 C.F.R. 1.48(a)(5), a Statement Under 37 CFR 3.73(b), in which DENSO Corporation (the original assignee of all rights in the present application in an original assignment executed by Mr. Ohtaka, a copy of which is attached to the Statement) consents to the addition of Mr. Goshima as an inventor in the above application, is attached.

Pursuant to 37 C.F.R. 1.48(a)(4), the required fee of \$130.00 as set forth in 37 C.F.R. §1.17(i) is enclosed herewith by check. Any further charges may be charged to Deposit Account 50-1147.

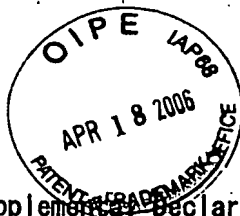
Respectfully submitted,

A handwritten signature in black ink, appearing to read 'DGP', is written over a horizontal line.

David G. Posz
Reg. No. 37,701
Customer No. 23400

DGP/TMA/yf

Posz & Bethards, PLC
11250 Roger Bacon Drive
Suite 10
Reston, VA 20190
(703) 707-9110



66298-LJS
LJ3-03110-K5

Posz & Bethards, PLC

Supplemental Declaration and Power of Attorney for Patent Application
特許出願宣誓書及び委任状
Japanese Language Declaration
日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、郵便住所、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して特許請求の範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者(下記の氏名が一つの場合)もしくは最初かつ共同発明者であると(下記の名称が複数の場合)信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PASSENGER DETECTING APPARATUS FOR VEHICLE

上記発明の明細書(下記の欄でx印がついていない場合は、本書に添付)は、

the specification of which is attached hereto unless the following box is checked:

☐ _____に提出され、米
国出願番号または PCT 国際出願番号を
_____とし、
(該当する場合) _____に補正されました。

☒ was filed on September 30, 2003
as United States Application Number or PCT
International Application Number 10/673,338
and was amended on _____
(if applicable).

私は、特許請求範囲を含む上記補正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1.56項に規定されたとおり、特許性の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

私は、以下に記載する特許もしくは発明者証の外国出願について米国法典第35編119条(a)-(d)項又は365条(b)項に基づく外国優先権を、又は以下に記載する米国以外の国の少なくとも一カ国を指定している PCT 国際出願について米国法典第35編365(a)項に基づく外国優先権をここに主張するとともに、優先権を主張している本出願の前に出願された特許もしくは発明者証の外国出願又は PCT 国際出願を、枠内をマークすることで以下に示します。

I hereby claim foreign priority under Title 35, United States Code, Section 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application for which priority is claimed.

Japanese Language Declaration
(日本語宣言書)

DGP

Prior Foreign Application(s)

Priority Not Claimed

外国での先行出願

(優先権主張なし)

1.	2002-289722	JAPAN	02/OCTOBER/2002	<input type="checkbox"/>
	(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	
2.				<input type="checkbox"/>
	(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	
3.				<input type="checkbox"/>
	(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	
4.				<input type="checkbox"/>
	(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	
5.				<input type="checkbox"/>
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6.				<input type="checkbox"/>
	(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	
7.				<input type="checkbox"/>
	(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	

☐ Additional Foreign Application(s) is(are) listed on the attached sheet which is incorporated herein by reference.

私は、下記の米国仮特許出願について第35編米国法典119条(e)項に基づく権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)	(Filing Date)
(出願番号)	(出願日)

(Application No.)	(Filing Date)
(出願番号)	(出願日)

私は、下記の米国特許出願について米国法典第35編1120条に基づく権利、又は米国を指定している下記のPCT国際出願について米国法典第35編365条(c)に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1段で規定された方法で先行する米国特許出願又はPCT国際出願に開示されていない限り、その先行出願の出願日以降で当該国内出願又はPCT国際出願の出願日までの期間中に入手された、連邦規則法典第37編1.56項で定義された特許性の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

Application No.	Filing Date
(出願番号)	(出願日)

Status :	Patented,	Pending,	Abandoned
(現況)	(特許許可済)	(係属中)	(放棄済)

Japanese Language Declaration
(日本語宣言書)

私は、私自身の知識に基いて本宣言書中で私が行う表明が真実であり、かつ私の入手した情報と私の信じることに基く表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基き、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行えば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

委任状： 私は下記の発明者として、本出願に関する一切の手續を米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。(弁護士、または代理人の氏名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

David G. Posz, Reg. No. 37701, Charles W. Bethards, Reg. No. 36453, R. Louis Breeden, Reg. No. 37286, James E. Barlow, Reg. No. 32377, Brian C. Altmiller, Reg. No. 37,271, Robert L. Scott, Reg. No. 43102, Teresa M. Arroyo, Reg. No. 50015 and all other attorneys and/or agents associated with PTO Customer No. 23400.

書類送付先： (Send Correspondence to)

David G. Posz, Esq., Posz & Bethards, PLC, 11250 Roger Bacon Drive, Suite 10, Reston, VA 20190, PTO Customer No. 23400

直接電話連絡先 (名前及び電話番号)： Direct Telephone Calls to (name and telephone number)

David G. Posz, Esq., (703) 707-9110

唯一または第一発明者 (Full name of sole or first inventor): Koji Ohtaka	
発明者の署名 (Inventor's Signature) <i>Koji Ohtaka</i>	
日付 (Date):	<i>March, 10, 2004</i>
住所 (Residence):	Chiryu-shi, Aichi-ken, Japan
国籍 (Citizenship):	Japan
郵便住所 (Post Office Address): c/o DENSO CORPORATION 1-1, Showa-cho, Kariya-city, Aichi-pref., 448-8661 Japan	

第二共同発明者 (Full name of second joint inventor): Satoshi Goshima	
発明者の署名 (Inventor's Signature) <i>Satoshi Goshima</i>	
日付 (Date):	<i>March, 19, 2004</i>
住所 (Residence):	Tokyo, Japan
国籍 (Citizenship):	Japan
郵便住所 (Post Office Address): c/o Fuji Jukogyo Kabushiki Kaisha 7-2, Nishishinjuku 1-chome, Shinjuku-ku, Tokyo 160-8316 Japan	

☐ Additional Inventor(s) is (are) listed on the attached sheet which is incorporated herein by reference.



662 96-45
43-03110-KC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): OHTAKA et al.	Atty. Docket: 11-196
Serial No.: 10/673,338	Group Art Unit: 2632
Filed: September 30, 2003	Examiner: TBD
Title: PASSENGER DETECTING APPARATUS FOR VEHICLE	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

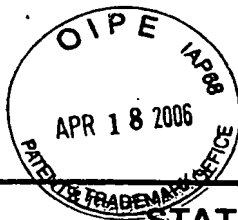
STATEMENT UNDER 37 CFR 1.48(a)(2)

Sir:

I, Satoshi Goshima, hereby state that I was originally omitted as a named inventor in the above identified pending U.S. patent application, and that such error in inventorship occurred without deceptive intention on my part.

Date: March 19, 2004

By: Satoshi Goshima
Satoshi Goshima



66296-LJS
LJ3-03/10-K5

Based on PTO/SB/96(08-00)

STATEMENT UNDER 37 CRF 3.73(b)

Applicant/Patent Owner: **DENSO CORPORATION**
Application No./Patent No. **10/673,338** Filed/Issue Date: **September 30, 2003**
Entitled: **PASSENGER DETECTING APPARATUS FOR VEHICLE**

DENSO CORPORATION, a **Corporation**
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title and interest.

The extent (by, percentage) of its ownership interest is _____ %
in the patent application/patent identified above by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, frame _____, or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ Copies of assignments or other documents in the chain of title are attached.
[NOTE: A separate copy (i.e., the original assignment document or a true copy of the original document) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee, and consents on behalf of the assignee to the addition of Mr. Satoshi Goshima as an inventor in the above-identified pending application.

March 9, 2004
Date

Hirohiko Usui
Typed or printed name

Signature
General Manager, Intellectual Property Dept.
Title



US006937143B2

(12) **United States Patent**
Ohtaka

(10) **Patent No.:** **US 6,937,143 B2**
(45) **Date of Patent:** **Aug. 30, 2005**

(54) **PASSENGER DETECTING APPARATUS FOR VEHICLE**

(75) **Inventor:** Koji Ohtaka, Chiryu (JP)

(73) **Assignees:** Denso Corporation, Kariya (JP); Fuji Jukogyo Kabushiki Kaisha, Tokyo (JP)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 125 days.

(21) **Appl. No.:** 10/673,338

(22) **Filed:** Sep. 30, 2003

(65) **Prior Publication Data**

US 2004/0075569 A1 Apr. 22, 2004

(30) **Foreign Application Priority Data**

Oct. 2, 2002 (JP) 2002-289722

(51) **Int. Cl.⁷** **B60Q 1/00**

(52) **U.S. Cl.** 340/438; 340/457.1; 340/425.5; 340/667; 701/45; 73/1.01; 73/1.08; 73/862; 180/273

(58) **Field of Search** 340/438, 457.1, 340/425.5, 667; 701/45; 180/273; 324/207.12; 280/735; 73/1.01, 1.08, 862

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,509,653 B2 * 1/2003 Fujimoto et al. 307/10.1

6,509,747 B2 * 1/2003 Nagai et al. 324/687
6,546,817 B1 4/2003 Aoki
6,817,254 B2 11/2004 Aoki
2003/0216886 A1 11/2003 Hattori et al.

FOREIGN PATENT DOCUMENTS

JP 2000-280813 10/2000
JP 2000280813 * 10/2000
JP 2000-302003 10/2000

* cited by examiner

Primary Examiner—Jeffery Hofsass

Assistant Examiner—Daniel Previl

(74) *Attorney, Agent, or Firm*—Posz Law Group, PLC

(57) **ABSTRACT**

The present invention relates to a vehicle passenger detecting apparatus capable of detecting an unoccupied-seat state through the use of existing signals in a vehicle and correcting an unoccupied-seat reference value with a simple configuration. In a case in which an ignition key switch and a buckle switch are in off conditions and a load detecting value, which is the sum of measurement data from load sensors in these conditions, falls below a predetermined unoccupied-seat load value, an occupied-seat reference value serving as a load measurement standard for detection of a state of a vehicle passenger is corrected using the load detection value. This eliminates the influence of vibrations stemming from engine revolutions and electrical noises and enables the reference value to be corrected using a stabler load detection value.

16 Claims, 6 Drawing Sheets

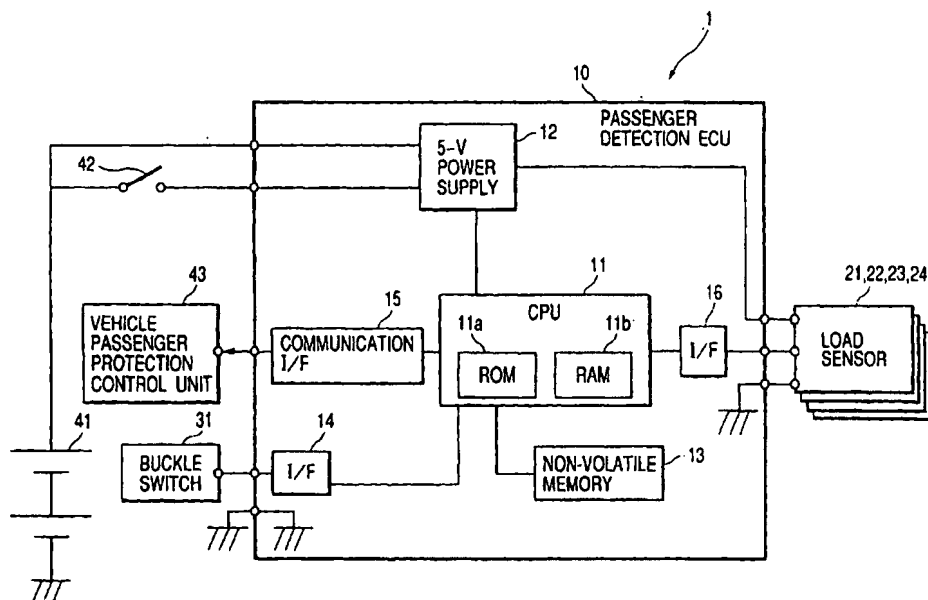
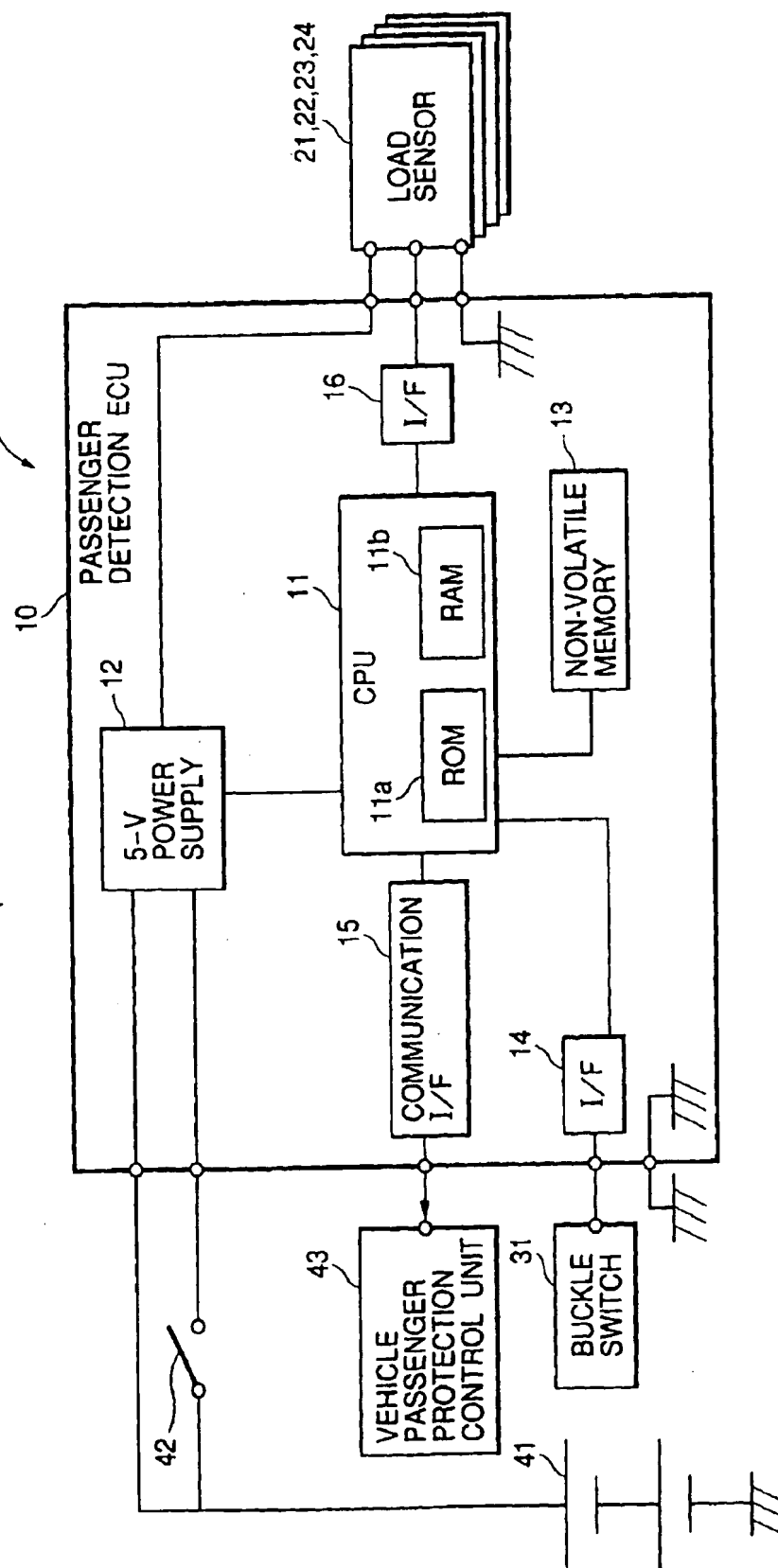


FIG. 1



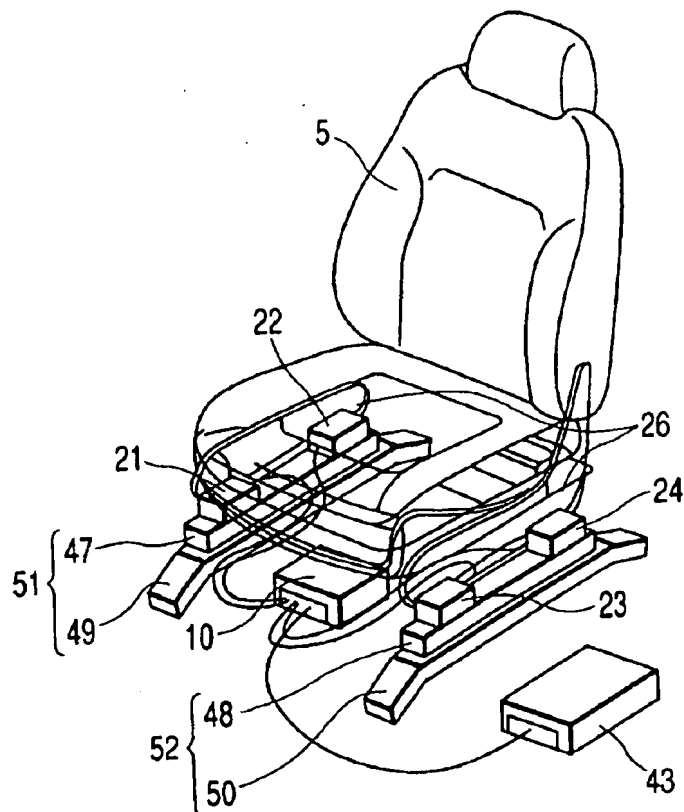


FIG. 4

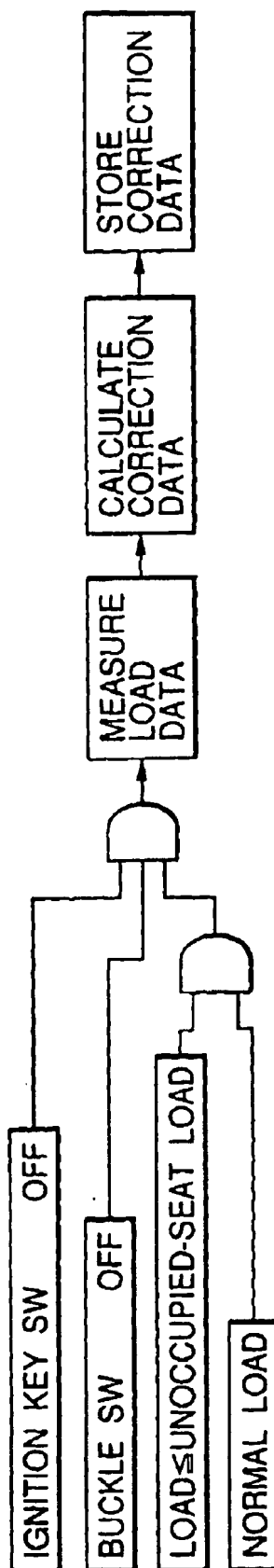


FIG. 5

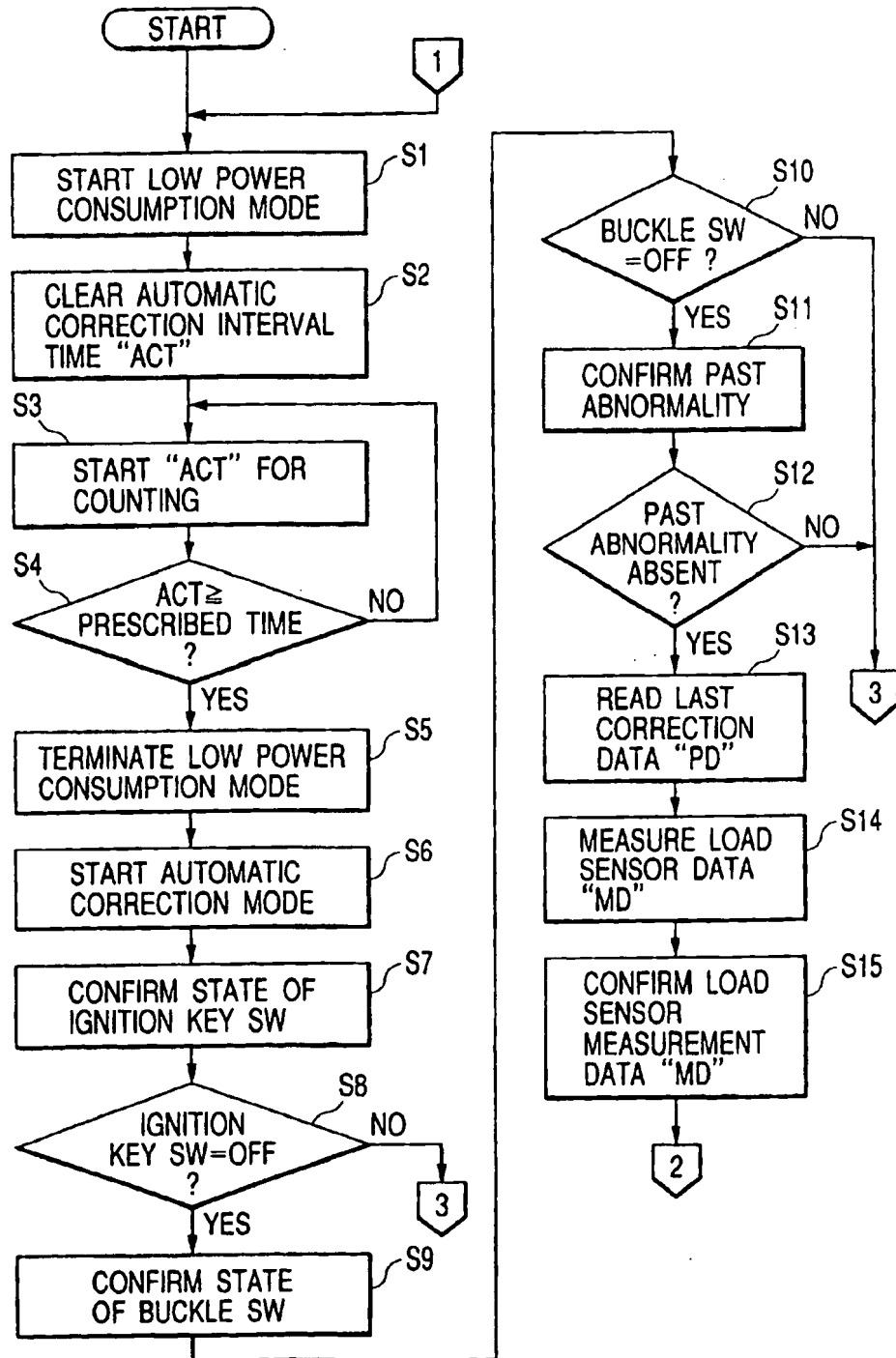


FIG. 6

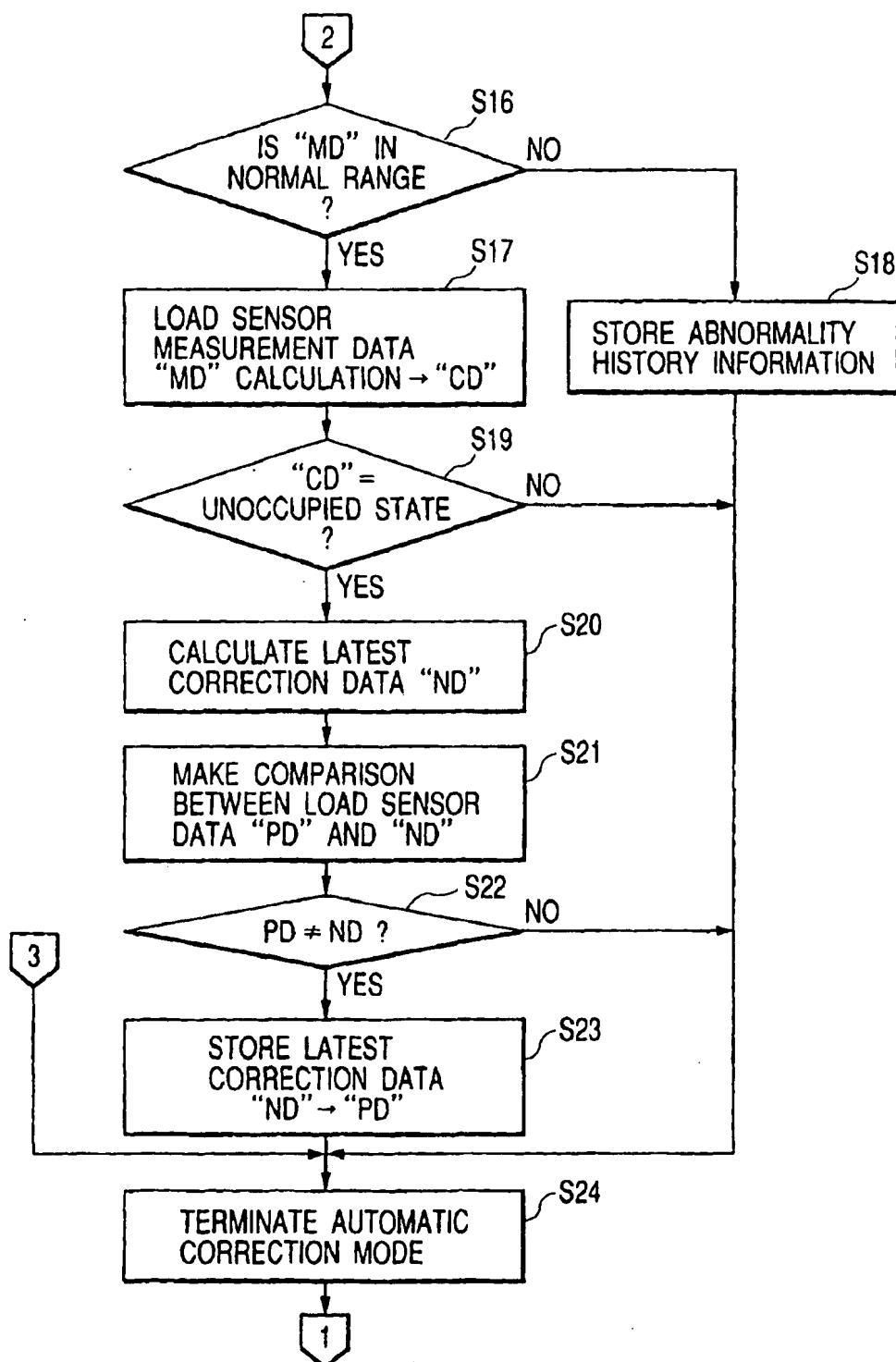
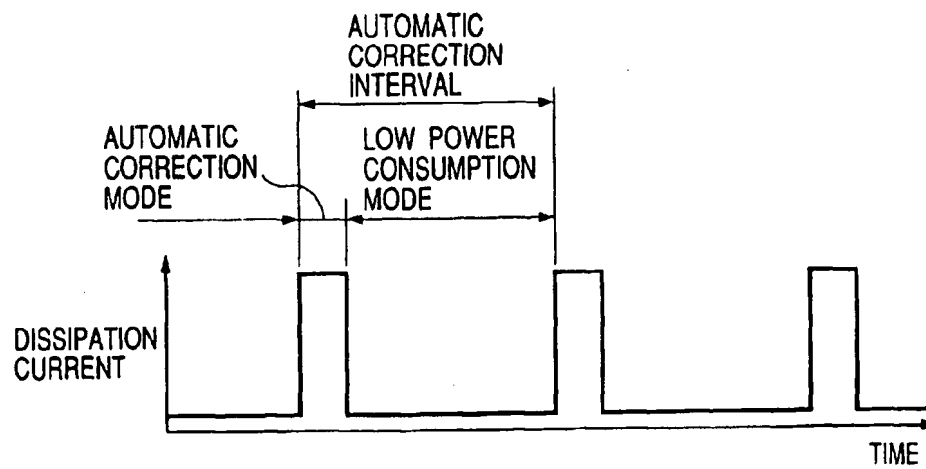


FIG. 7



1

PASSENGER DETECTING APPARATUS FOR
VEHICLE

BACKGROUND OF THE INVENTION

1) Field of the Invention

The present invention relates to a vehicle passenger detecting apparatus which makes a decision on a state of a passenger (including a driver) sitting on a seat of a vehicle and transmits the state information to a vehicle passenger protecting apparatus.

2) Description of the Related Art

So far, there has been proposed a vehicle passenger detecting apparatus in which a load sensor is placed under a vehicle seat to detect a variation of pressure stemming from a passenger load for making a decision on a state of a passenger. In such a apparatus, a drift of the measurement reference (standard) for load sensor output can occur due to the mechanical accustomization of a load sensor and a seat component, applied mechanical repeated vibrations, applied mechanical impacts, environmental variations such as variations of temperature and humidity, and aging. In addition, when a drift of the measurement reference occurs, difficulty is experienced in making an accurate decision on the passenger state through the use of that load sensor. Therefore, for the accurate decision on the passenger state, there is a need to correct an unoccupied-seat reference serving as a measurement reference by precisely detecting an unoccupied seat and detecting a variation of an 0-kg load output.

So far, in consideration of such objects, there has been proposed a technique in which, in addition to a load sensor placed under a seat, a mat-type passenger presence/absence discrimination sensor is placed under a surface of a hip-supporting portion of a seat to make a decision/detection on an unoccupied state of the seat and, when a passenger is absent on the seat, a correction is made with respect to the measurement data from a load sensor (see Japanese Patent Laid-Open No. 2000-302003). This conventional technique can precisely detect the fact that a seat is in an unoccupied state, thereby correcting an unoccupied-seat reference.

There is a problem which arises with the conventional technique disclosed in Japanese Patent Laid-Open No. 2000-302003, however, in that the employment of the unoccupied-seat discrimination sensor and the load sensor increases the number of components of a vehicle seat, which leads to increasing the number of assembling steps and the cost of parts.

SUMMARY OF THE INVENTION

The present invention has been developed with a view to eliminating such a problem, and it is therefore an object of the invention to provide a vehicle passenger detecting apparatus with a simple construction capable of detecting an unoccupied state through the use of an existing signal in a vehicle for making a correction of an unoccupied-seat reference.

For this purpose, in accordance with an aspect of the present invention, there is provided a vehicle passenger detecting apparatus in which a load sensor is provided to detect a load acting on a vehicle seat on the basis of a distortion of a seat adjuster portion so that a load detection value taken when the vehicle seat is in an unoccupied state is stored as an unoccupied-seat reference value in advance and a state of a seated passenger on the vehicle seat is detected on the basis of a relative value between a load

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detection value from the load sensor and the unoccupied-seat reference value, the apparatus being characterized by comprising reference correcting means for, in a case in which an ignition key switch and a buckle switch are in off conditions (turning-off conditions) and a load detection value from the load sensor in the off conditions falls below an unoccupied-seat load value set in advance, correcting the unoccupied-seat reference value through the use of the load detection value from the load sensor.

Thus, when both the ignition key switch and buckle switch are in the off conditions and a load detection value obtained by the load sensor in the off conditions falls below the unoccupied-seat load value set in advance, the reference correcting means corrects the unoccupied-seat reference value through the use of the load detection value obtained by the load sensor. In this case, since the ignition key switch is in the off condition, a detection of the fact that the vehicle is in a stopping condition becomes possible. Moreover, since the buckle switch is in the off condition, a detection of the fact that a vehicle seat belt is in an unfastened condition becomes possible. Still moreover, because of making it a condition that a load detection value from the load sensor in the off conditions falls below an unoccupied-seat load value set in advance, a detection of the fact that a passenger does not sit on the vehicle seat and a heavy baggage or the like does not exist on the vehicle seat becomes possible. That is, in a case in which not only the vehicle is in a stopping condition but also a passenger does not sit on the vehicle seat and even a heavy baggage or the like does not exist on the vehicle seat, an unoccupied-seat state is recognizable, and the unoccupied-seat reference value is corrected on the basis of a load detection value from the load sensor in this state. Moreover, while the vehicle is moving, a state of a seated passenger on the vehicle seat is detected on the basis of a relative value between the load detection value from the load sensor and the corrected unoccupied-seat reference value.

Accordingly, even if a drift of an unoccupied-seat reference value for load sensor output can occur due to the mechanical accustomization of a seat adjuster portion, applied mechanical repeated vibrations, applied mechanical impacts, environmental variations such as variations of temperature and humidity, and aging, the unoccupied-seat reference value is securely corrected by the reference correcting means, which enables a state of a seated passenger to be detected with high accuracy. Moreover, when the vehicle is in a stopping condition, it is possible to more stably correct the unoccupied-seat reference value on the basis of a stabler load detection value from the load sensor without receiving influence of vibrations due to the engine revolution or the like or electrical noises. Still moreover, because of the employment of signals from the ignition key switch and the buckle switch which are the existing signals in a vehicle, there is no need to additionally use a sensor or the like for the detection of the unoccupied state, thus avoiding an increase in assembling steps and cost.

In addition, in accordance with a further aspect of the present invention, there is provided a vehicle passenger detecting apparatus comprising a seat track interposed between a floor and a seat cushion frame to make the seat cushion frame movable in longitudinal directions of a vehicle with respect to the floor and a load sensor for detecting a load acting on the seat cushion frame on the basis of a displacement of the seat cushion frame with respect to an upper rail of the seat track, wherein a load detection value taken when a vehicle seat is in an unoccupied state is stored as an unoccupied-seat reference value in advance and a state of a seated passenger on the vehicle seat is detected on the

basis of a relative value between a load detection value from the load sensor and the unoccupied-seat reference value, the apparatus being characterized by comprising reference correcting means for, in a case in which an ignition key switch and a buckle switch are in off conditions and a load detection value from the load sensor in the off conditions falls below an unoccupied-seat load value set in advance, correcting the unoccupied-seat reference value through the use of the load detection value from the load sensor.

Thus, when both the ignition key switch and buckle switch are in the off conditions and a load detection value obtained by the load sensor in the off conditions falls below the unoccupied-seat load value set in advance, the reference correcting means corrects the unoccupied-seat reference value through the use of the load detection value obtained by the load sensor. In this case, the state where the ignition key switch is in the off condition signifies the fact that the vehicle is in a stopping condition. Moreover, the state where the buckle switch is in the off condition signifies the fact that a vehicle seat belt is in an unfastened condition. Still moreover, the state where a load detection value from the load sensor in the off conditions falls below an unoccupied-seat load value set in advance signifies the fact that a passenger does not sit on the vehicle seat and a heavy baggage or the like does not exist on the vehicle seat. That is, in a case in which not only the vehicle is in a stopping condition but also a passenger does not sit on the vehicle seat and even a heavy baggage or the like does not exist on the vehicle seat, an unoccupied-seat state is recognizable, and the unoccupied-seat reference value is corrected on the basis of a load detection value from the load sensor in this state. Moreover, while the vehicle is moving, a state of a seated passenger on the vehicle seat is detected on the basis of a relative value between the load detection value from the load sensor and the corrected unoccupied-seat reference value.

Accordingly, even if a drift of an unoccupied-seat reference value for load sensor output can occur due to the mechanical accustomization of the seat track and the seat cushion frame, applied mechanical repeated vibrations, applied mechanical impacts, environmental variations such as variations of temperature and humidity, and aging, the unoccupied-seat reference value is securely corrected by the reference correcting means, which enables a state of a seated passenger to be detected with high accuracy. Moreover, when the vehicle is in a stopping condition, it is possible to more stably correct the unoccupied-seat reference value on the basis of a stabler load detection value from the load sensor without receiving influence of vibrations due to the engine revolution or the like or electrical noises. Still moreover, because of the employment of signals from the ignition key switch and the buckle switch which are the existing signals in a vehicle, there is no need to additionally use a sensor or the like for the detection of the unoccupied state, thus avoiding an increase in assembling steps and cost.

Still additionally, according to a further aspect of the present invention, in the vehicle passenger detecting apparatus, the unoccupied-seat reference value is stored in a rewritable-type non-volatile memory.

Therefore, the unoccupied-seat reference value to be stored in the non-volatile memory is rewritten whenever a correction of the unoccupied-seat reference value takes place, and, even after the power-off, the stored contents are maintainable.

Yet additionally, according to a further aspect of the present invention, in the vehicle passenger detecting apparatus, the reference correcting means does not correct

the unoccupied-seat reference value in a case in which the load detection value from the load sensor when both the ignition key switch and the buckle switch are in off conditions exceeds a predetermined threshold.

Since it is considered that the case in which the load detection value from the load sensor when both the ignition key switch and the buckle switch are in off conditions exceeds a predetermined threshold corresponds to a case in which some abnormality such as a trouble of the load sensor or influence of a noise occurs, the correction of the unoccupied-seat reference value is inhibited in such situations, thereby preventing the unoccupied-seat reference value based on an abnormal detection value from being stored.

Moreover, according to a further aspect of the present invention, the vehicle passenger detecting apparatus further comprises abnormality history storing means for storing abnormality history information indicative of a detection of an abnormal value in a case in which the load detection value from the load sensor when both the ignition key switch and the buckle switch are in off conditions exceeds a predetermined threshold, and the reference correcting means does not correct the unoccupied-seat reference value when the abnormality history information is stored in the abnormality history storing means.

Thus, when the abnormality history information is stored in the abnormality history storing means, since the reliability of the present load detection value from the load sensor is considered to be low, the correction of the unoccupied-seat reference value is inhibited in such a case, thereby avoiding the storing of the unoccupied-seat reference value based on the low-reliability detection value.

Still moreover, according to a further aspect of the present invention, in the vehicle passenger detecting apparatus, the reference correcting means automatically corrects the unoccupied-seat reference value on a predetermined cycle.

Thus, since the reference correcting means automatically corrects the unoccupied-seat reference value on a predetermined cycle, a state of a seated passenger is detectable through the use of the latest unoccupied-seat reference value at all times.

In addition, according to a further aspect of the present invention, in the vehicle passenger detecting apparatus, the reference correcting means is operated in a low power consumption mode during a waiting period in the case of the unoccupied-seat reference value being automatically corrected on the predetermined cycle.

Thus, in a case in which the unoccupied-seat reference value is automatically corrected on the predetermined cycle, the reference correcting means is operated in a low power consumption mode during a waiting period, which can suppress the power consumption.

Still additionally, according to a further aspect of the present invention, in the vehicle passenger detecting apparatus, the reference correcting means is operable through the use of a battery mounted in the vehicle.

Thus, since the reference correcting means is operable with the vehicle battery, there is no need to use a power source additionally, and since the reference correcting means is operated in a low power consumption mode during the waiting period in the case of the automatic correction of the unoccupied-seat reference value to be implemented when the ignition key switch is in an off condition, it is possible to reduce the power consumption of the vehicle battery.

Yet additionally, according to a further aspect of the present invention, in the vehicle passenger detecting

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apparatus, a load detection value from the load sensor is stored in time series, and the reference correcting means corrects the unoccupied-seat reference value through the use of a plurality of load detection values taken in time series.

Thus, since the reference correcting means corrects the unoccupied-seat reference value through the use of a plurality of load detection values taken in time series, the influence of noise or the like is surely reducible, which enables the unoccupied-seat reference value to be corrected with higher accuracy.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and features of the present invention will become more readily apparent from the following detailed description of the preferred embodiment taken in conjunction with the accompanying drawings in which:

FIG. 1 is a block diagram showing a hardware configuration of a vehicle passenger detecting apparatus according to an embodiment of the present invention;

FIG. 2 is an plan view illustratively showing locations of components of the vehicle passenger detecting apparatus according to the embodiment in a vehicle;

FIG. 3 is a perspective view showing locations of the components of the vehicle passenger detecting apparatus according to the embodiment in the vehicle;

FIG. 4 is a block diagram schematically showing a flow of correction of an unoccupied-seat reference value according to the embodiment;

FIG. 5 is a flow chart showing a flow of an automatic correction routine for an unoccupied-seat reference value according to the embodiment;

FIG. 6 is a flow chart showing a flow of the automatic correction routine for an unoccupied-seat reference value according to the embodiment; and

FIG. 7 is a graphic illustration of a variation of dissipation current in the implementation of the automatic correction routine according to the embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A vehicle passenger detecting apparatus according to an embodiment of the present invention will be described hereinbelow with reference to the drawings. FIG. 1 is a block diagram showing a hardware configuration of a vehicle passenger detecting apparatus according to this embodiment, FIG. 2 is an plan view illustratively showing locations of components constituting the vehicle passenger detecting apparatus according to the embodiment in a vehicle, and FIG. 3 is a perspective view showing locations of the components of the vehicle passenger detecting apparatus in the vicinity of a vehicle seat (portion surrounded by an alternate long and short dash line in FIG. 2) in the vehicle.

As FIG. 1 shows, a vehicle passenger detecting apparatus, generally designated at reference numeral 1, is made up of a passenger detection electronic control unit (which will be referred to hereinafter as a "passenger detection ECU") 10 and four distortion-type load sensors 21, 22, 23 and 24. The distortion-type load sensors 21 to 24 constitute the load sensor in the present invention.

The passenger detection ECU 10 is placed under a vehicle seat 5 (see FIGS. 2 and 3) and, as shown in FIG. 1, is composed of a CPU (Central Processing Unit) 11, a 5-V power supply source 12, a non-volatile memory 13, a buckle switch interface (I/F) 14, a communication interface (I/F) 15

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and a load sensor interface (I/F) 16. Although in FIGS. 2 and 3 the vehicle passenger detecting apparatus 1 is located at an assistant driver's seat, it is also appropriate that the apparatus 1 is located at another seat. For example, in consideration of the extendibility of the system, it is also preferable that the vehicle passenger detecting apparatus 1 according to this embodiment is placed at the driver's seat, a rear seat or the like.

The CPU 11 is connected to an ignition key switch (IG-SW) 42 connected to a vehicle battery 41 so that the switching between its activation and stop is made in accordance with an on/off signal from the ignition key switch 42, and operates in response to power supply from the 5-V power supply source 12. The CPU 11 internally includes a ROM 11a and a RAM 11b, and reads out a passenger detection processing program and an automatic correction processing routine from the ROM 11a and implements it. The RAM 11b has an area to be used as a work area by the CPU 11, and others.

The 5-V power supply source 12 is for supplying power for operations to internal circuits of the passenger detection ECU 10, and is connected to two power supply systems: a power supply system from the vehicle battery 41 serving as an operating power supply source and a power supply system from the ignition key switch 42 connected to the vehicle battery 41.

The non-volatile memory 13 is of a rewritable type, and the stored contents therein are electrically rewritable. The non-volatile memory 13 stores unoccupied-seat reference values and abnormality history information which will be described later.

The buckle switch I/F 14 is connected through a communication line to a buckle switch 31, and is an interface circuit having a function to receive an on/off signal from the buckle switch 31 through the communication line and to put it in the CPU 11.

The communication I/F 15 is connected through a communication line to a vehicle passenger protection control unit 43 for controlling a vehicle passenger protecting device such as an air bag, and is an interface circuit having a function to transmit a decision result on a passenger state obtained in the CPU 11 through the communication line to the vehicle passenger protection control unit 43.

As shown in FIGS. 2 and 3, the load sensors 21 to 24 are placed at a right-side front portion, a right-side rear portion, a left-side front portion and a left-side rear portion under the vehicle seat 5, respectively, and each is made to output a load, applied to each portion of the vehicle seat 5, in the form of an analog voltage signal. In more detail, as shown in FIG. 3, in the interior of the vehicle, seat tracks 51 and 52 are fixedly secured onto a floor of the vehicle, and each of the seat tracks 51 and 52 is composed of a seat track lower rail 49, 50 fixed to the floor of the vehicle and a seat track upper rail 47, 48 made to allow the vehicle seat 5 slide forwardly and rearwardly. The load sensors 21 to 24 are placed between the seat track upper rail 47, 48 and seat cushion frames 26, and are designed to detect a load acting on the seat cushion frames 26 on the basis of displacement of the seat cushion frames 26 with respect to the seat track upper rail 47, 48. Moreover, the distortion-type load sensors 21 to 24 are made to operate in response to a power supply from the aforesaid 5-V power supply source 12 in the passenger detection ECU 10.

The seat tracks 51, 52 and the seat cushion frames 26 constitute the seat adjuster portion in the present invention.

The vehicle passenger protection control unit 43 is for executing spread control on an air bag 44 serving as a

vehicle passenger protecting device, and as shown in FIGS. 2 and 3, is placed in the interior of the vehicle and is connected through a communication line to a communication I/F 15 of the passenger detection ECU 10. In a case in which a G sensor (not shown) detects the occurrence of collision of a vehicle, the vehicle passenger protection control unit (air bag ECU) 43 executes the spread control on the air bag 44, i.e., bag spread implementation/stop control or bag spreading quantity control according to the type of a passenger (adult, child, or the like), in accordance with a state of a passenger from the passenger detection ECU 10.

For example, when the information on passenger state from the passenger detection ECU 10 indicates "unoccupied seat", the vehicle passenger protection control unit 43 does not execute the bag spreading irrespective of a detection of a vehicle collision. Moreover, when a vehicle collision is detected and the passenger state indicates "adult", the vehicle passenger protection control unit 43 executes control for spreading the bag maximally. On the other hand, if a vehicle collision is detected and the passenger state indicates "child", the vehicle passenger protection control unit 43 controls the bag spread to an appropriate degree.

Secondly, referring to FIGS. 4 to 6, a description will be given hereinbelow of processing for automatically correcting an unoccupied-seat reference value according to this embodiment. In this case, the "unoccupied-seat reference value" is a value forming a load measurement standard in the vehicle seat 5, and corresponds to a load sensor output at 0-kg load. In the following description, the data obtained by correcting an unoccupied-seat reference value according to automatic correction processing will be referred to as "unoccupied-seat reference value correction data" or referred to simply as "correction data".

FIG. 4 is a block diagram schematically showing conditions of the correction of an unoccupied-seat reference value and steps to be implemented until the unoccupied-seat reference value correction data is stored in a non-volatile memory. That is, the unoccupied-seat reference value correction is made when 1) the ignition key switch 42 is in an off state, 2) the buckle switch 31 is in an off state, 3) a load taken when the switches 42 and 31 are the off states falls below a predetermined unoccupied-seat load and 4) a load is in a normal load range. That is, the unoccupied-seat reference value correction is satisfied when the AND conditions of 1) to 4) are satisfied. After the measurement of load data and the calculation of correction data based on the load data, the correction data is stored in the non-volatile memory 13.

Furthermore, referring to flow charts of an automatic correction processing routine of FIGS. 5 and 6, a detailed description will be given hereinbelow of the automatic correction processing on an unoccupied-seat reference value. The CPU 11 reads out this routine from the ROM 11a and implements it when, in a state of a normal operating mode in which the ignition key switch 42 is in an on condition (turning-on condition) and a decision is made on a passenger on the vehicle seat 5, the ignition key switch 42 is turned off.

When this routine is read out therefrom, a low power consumption mode first starts (step 1, which will be referred to simply as "S1", and the other steps as well as this step 1). In this case, the "low power consumption mode" signifies an operating mode in which the CPU 11 operates at a current value lower than usual, and only a time measuring operation for an automatic correction interval is conducted during this mode.

When the low power consumption mode starts, an automatic correction interval timer "ACT" is cleared (initialized)

(S2). The timer "ACT" conducts the counting operation (S3), and a decision is made as to whether or not the timer "ACT" reaches a prescribed automatic correction interval time (which will be referred to hereinafter as a "prescribed time") (S4). If it does not reach the prescribed time (S4: No), the steps 3 and 4 are implemented repeatedly. In this case, for example, the prescribed time is set at approximately one hour. In this connection, the prescribed time depends on the with-time magnitude of an actual correction quantity.

On the other hand, when the timer "ACT" reaches the prescribed time (S4: Yes), the low power consumption mode comes to an end (S5), and the automatic correction mode starts (S6). In the automatic correction mode, a confirmation is made on a state of the ignition key switch 42 (S7). In a case in which the ignition key switch 42 is in the on condition (S8: No), the automatic correction mode comes to an end (S24).

If the ignition key switch 42 is in the off condition (S8: Yes), a confirmation is made on a state of the buckle switch 31 (S9). If the buckle switch 31 is in the on condition (S10: No), the automatic correction mode comes to an end (S24).

If the buckle switch 31 is in the off condition (S10: Yes), past history information is read out from the non-volatile memory 13 (S11), and a decision is made as to whether abnormality history information exists or not (S12). If the abnormality history information exists (S12: No), the automatic correction mode comes to an end (S24). In this case, the "abnormality history information" is information indicative of the fact that an abnormal value was outputted from the load sensors 21 to 24.

In the case of no abnormality history information (S12: Yes), the last correction data "PD" is read out from the non-volatile memory 13 (S13). Subsequently, the output signals "MD" from the four load sensors 21 to 24 are measured (S14), and a decision is made as to whether or not each of the load sensor measurement data "MD" falls below a predetermined threshold, that is, whether it is in a normal range (S15). If the data "MD" is out of the normal range (S16: No), abnormality history information is stored in the non-volatile memory 13 (S18), and the automatic correction mode comes to an end (S24). The threshold to be used for making a decision as to whether or not the data "MD" is in the normal range is set to a vehicle in which the passenger detection ECU 10 is mounted.

If the data "MD" is in the normal range (S16: Yes), the sum of the "MDs" outputted from the load sensors 21 to 24 is calculated, thereby obtaining an unoccupied-seat decision value "CD" (S17). If the decision value "CD" exceeds a predetermined unoccupied-seat load value, that is, when a passenger sits on the vehicle seat 5 or a baggage exists thereon (S19: No), the automatic correction mode comes to an end (S24). The "unoccupied-seat load value" is a threshold to be used for making a decision on an unoccupied-seat state, and is set at a value obtained by adding a predetermined margin to the dead weight of the vehicle seat 5. Therefore, the unoccupied-seat load value is set to a vehicle in which the passenger detection ECU 10 is mounted.

On the other hand, if the decision value "CD" is below the predetermined unoccupied-seat load value, that is, in the case of an unoccupied state (S19: Yes), the latest correction data "ND" is calculated on the basis of the decision value "CD" (S20). In this case, the correction data "ND" is calculated so that the passenger decision is appropriately made when the ignition key switch 42 is turned on after the present correction operation. Moreover, a comparison is made between the last correction data "PD" and the latest

correction data "ND" (S21), and if the last correction data "PD" and the present correction data "ND" are equal to each other (S22: No), the automatic correction mode comes to an end (S24). On the other hand, if the last correction data "PD" and the present correction data "ND" are different from each other (S22: YES), the latest correction data "ND" is stored in the non-volatile memory 13 as correction data "PD" for the next correction operation (S23), and the automatic correction mode comes to an end (S24). After the completion of the automatic correction mode (S24), the operational flow again returns to the step 1 and subsequent steps.

FIG. 7 is a graphic illustration of a variation of dissipation current at the implementation of the automatic correction routine. As obvious from FIG. 7, the automatic correction mode and the low power consumption mode are repeated on a predetermined cycle (automatic correction interval), and the dissipation current becomes high during the automatic correction mode while it is suppressible during the low power consumption mode.

As seen from the above detailed description, according to this embodiment, in a case in which both the ignition key switch 42 and the buckle switch 31 are in the off conditions and a load detection value "CD" which is the sum of the measurement data "MD" from the load sensors 21 to 24 in this conditions is below a predetermined unoccupied-seat load value, the unoccupied-seat reference value (previous correction data) is corrected through the use of that load detection value. Accordingly, since the ignition key switch 42 is in the off condition, the fact that the vehicle is in a stopping condition is detectable. Moreover, since the buckle switch 31 is in the off condition, the fact that the vehicle seat belt is in the unfastened condition is detectable. Still moreover, since a load detection value obtained by the load sensors 21 to 24 in these conditions is below a predetermined unoccupied-seat load value, the fact that a passenger does not sit on the vehicle seat 5 and a heavy baggage or the like does not exist thereon is detectable. That is, when the vehicle is in the stopping state and a passenger, a heavy baggage or the like does not exist on the vehicle seat 5, the state of the vehicle is recognized as an unoccupied-seat state, and the unoccupied-seat reference value is corrected using a load detection value obtained by the load sensors 21 to 24 in this state. In addition, in a normal mode when the vehicle is moving, a state of a seated passenger on the vehicle seat 5 is detected on the basis of a relative value between a load detection value obtained by the load sensors 21 to 24 and the corrected unoccupied-seat reference value. In this case, the "detection of a state of a seated passenger" signifies, for example, a detection of "adult sits thereon", "child sits thereon", or "seat is unoccupied".

Accordingly, even if a drift of an unoccupied-seat reference value for load sensor output occurs due to the mechanical accustomization of a seat adjuster portion (seat cushion frames 26 and the seat tracks 51 and 52), applied mechanical repeated vibrations, applied mechanical impacts, environmental variations such as variations of temperature and humidity, and aging, the unoccupied-seat reference value is securely corrected through the processing in the automatic correction routine, which enables a state of a seated passenger to be detected with high accuracy. Moreover, when the vehicle is in a stopping condition, it is possible to more stably correct the unoccupied-seat reference value on the basis of stabler lead detection values from the load sensors 21 to 24 without receiving influence of vibrations due to the engine revolution or the like or electrical noises. Still moreover, because of the employment of signals from the ignition key switch 42 and the buckle switch 31 which are

the existing signals in a vehicle, there is no need to additionally use a sensor or the like for the detection of the unoccupied state, thus avoiding an increase in assembling steps and cost.

Furthermore, according to this embodiment, since the unoccupied-seat reference value (correction data) is stored in the rewritable-type non-volatile memory 13, whenever the unoccupied-seat reference value undergoes correction, the unoccupied-seat reference value to be stored in the non-volatile memory 13 can be rewritten and the stored contents can be maintained even after the power-off.

Still furthermore, according to this embodiment, in a case in which a load detection value obtained by the load sensors 21 to 24 when both the ignition key switch 42 and the buckle switch 31 are in the off conditions exceeds a predetermined threshold, the correction of the unoccupied-seat reference value is inhibited. The case of "a load detection value obtained by the load sensors 21 to 24 when both the ignition key switch 42 and the buckle switch 31 are in the off conditions exceeds a predetermined threshold" can signify a case in which some abnormality such as a trouble of the load sensors 21 to 24 or influence of a noise occurs, and the correction of the unoccupied-seat reference value is not made in such situations, thereby preventing the unoccupied-seat reference value based on an abnormal detection value from being stored.

Moreover, according to this embodiment, in a case in which a load detection value obtained by the load sensors 21 to 24 when both the ignition key switch 42 and the buckle switch 31 are in the off conditions exceeds a predetermined threshold, abnormality history information indicative of the detection of an abnormal value is stored in the non-volatile memory 13, and if the abnormality history information is stored in the non-volatile memory 13, the correction of the unoccupied-seat reference value is inhibited. In the case of the abnormality history information being stored in the non-volatile memory 13, since it can be considered that the reliability of the present load detection values from the load sensors 21 to 24 is low, the correction of the unoccupied-seat reference value is not made in such situations, which avoids storing the unoccupied-seat reference value based on a low-reliability detection value.

Still moreover, according to this embodiment, since the unoccupied-seat reference value is made to be automatically corrected on a predetermined cycle (automatic correction interval), a state of a seated passenger is detectable with high accuracy through the use of the latest unoccupied-seat reference value.

In addition, according to this embodiment, since the passenger detection ECU 10 is designed to be operable by the vehicle battery 41, there is no need to use a power supply source additionally. Still additionally, since the system is operated in a low power consumption mode during a waiting period in the case of the unoccupied-seat reference value being automatically corrected when the ignition key switch 42 is in the off condition, the power consumption in the vehicle battery 41 is suppressible.

It should be understood that the present invention is not limited to the above-described embodiment, and that it is intended to cover all changes and modifications of the embodiment of the invention herein which do not constitute departures from the spirit and scope of the invention.

For example, although in the above-described embodiment a passenger state decision result is transmitted to the vehicle passenger protection control unit 43 for executing the spread control on the air bag 44, it is also appropriate that

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the passenger state decision result is transmitted to a control unit for another vehicle passenger protecting device such as a seat belt with pretension or a device for repeatedly winding a seat belt through the use of a motor or the like.

Moreover, although in the above-described embodiment the unoccupied-seat reference value is corrected using the load measurement data at one point of time, it is also appropriate that the load measurement data are stored in time series at a plurality of points of time and the unoccupied-seat reference value is corrected using the plurality of time-series load measurement data. This surely reduce the influence of noise or the like and enables the correction of the unoccupied-seat reference value to be made with higher accuracy.

What is claimed is:

1. A vehicle passenger detecting apparatus in which a load sensor is provided to detect a load acting on a vehicle seat on the basis of a distortion of a seat adjuster portion in a vehicle so that a load detection value taken when said vehicle seat is in an unoccupied state is stored as an unoccupied-seat reference value in advance and a state of a seated passenger on said vehicle seat is detected on the basis of a relative value between a load detection value from said load sensor and said unoccupied-seat reference value, said apparatus comprising reference correcting means for, in a case in which an ignition key switch and a buckle switch are in off conditions and a load detection value from said load sensor in said off conditions falls below an unoccupied-seat load value set in advance, correcting said unoccupied-seat reference value through the use of said load detection value from said load sensor.

2. The apparatus according to claim 1, wherein said unoccupied-seat reference value is stored in a rewritable-type non-volatile memory.

3. The apparatus according to claim 1, wherein said reference correcting means does not correct said unoccupied-seat reference value in a case in which said load detection value from said load sensor when both said ignition key switch and said buckle switch are in the off conditions exceeds a predetermined threshold.

4. The apparatus according to claim 1, further comprising abnormality history storing means for storing abnormality history information indicative of a detection of an abnormal value in a case in which said load detection value from said load sensor when both said ignition key switch and said buckle switch are in the off conditions exceeds a predetermined threshold so that said reference correcting means does not correct said unoccupied-seat reference value when said abnormality history information is stored in said abnormality history storing means.

5. The apparatus according to claim 1, wherein said reference correcting means automatically corrects said unoccupied-seat reference value on a predetermined cycle.

6. The apparatus according to claim 5, wherein said reference correcting means is operated in a low power consumption mode, which suppresses power consumption, during a waiting period in the case of said unoccupied-seat reference value being automatically corrected on said predetermined cycle.

7. The apparatus according to claim 6, wherein said reference correcting means is operable through the use of a battery mounted in said vehicle.

8. The apparatus according to claim 1, wherein said load detection value from said load sensor is stored in time series,

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and said reference correcting means corrects said unoccupied-seat reference value through the use of a plurality of load detection values taken in time series.

9. A vehicle passenger detecting apparatus comprising:

a seat track interposed between a floor of a vehicle and a seat cushion frame of said vehicle to make said seat cushion frame movable in longitudinal directions of said vehicle with respect to said floor; and a load sensor for detecting a load acting on said seat cushion frame on the basis of a displacement of said seat cushion frame with respect to an upper rail of said seat track, with a load detection value taken when a vehicle seat is in an unoccupied state being stored as an unoccupied-seat reference value in advance and a state of a seated passenger on said vehicle seat being detected on the basis of a relative value between a load detection value from said load sensor and said unoccupied-seat reference value,

said apparatus including reference correcting means for, in a case in which an ignition key switch and a buckle switch are in off conditions and a load detection value from said load sensor in said off conditions falls below an unoccupied-seat load value set in advance, correcting said unoccupied-seat reference value through the use of said load detection value from said load sensor.

10. The apparatus according to claim 9, wherein said unoccupied-seat reference value is stored in a rewritable-type non-volatile memory.

11. The apparatus according to claim 9, wherein said reference correcting means does not correct said unoccupied-seat reference value in a case in which said load detection value from said load sensor when both said ignition key switch and said buckle switch are in the off conditions exceeds a predetermined threshold.

12. The apparatus according to claim 9, further comprising abnormality history storing means for storing abnormality history information indicative of a detection of an abnormal value in a case in which said load detection value from said load sensor when both said ignition key switch and said buckle switch are in the off conditions exceeds a predetermined threshold so that said reference correcting means does not correct said unoccupied-seat reference value when said abnormality history information is stored in said abnormality history storing means.

13. The apparatus according to claim 2, wherein said reference correcting means automatically corrects said unoccupied-seat reference value on a predetermined cycle.

14. The apparatus according to claim 13, wherein said reference correcting means is operated in a low power consumption mode, which suppresses power consumption, during a waiting period in the case of said unoccupied-seat reference value being automatically corrected on said predetermined cycle.

15. The apparatus according to claim 14, wherein said reference correcting means is operable through the use of a battery mounted in said vehicle.

16. The apparatus according to claim 9, wherein said load detection value from said load sensor is stored in time series, and said reference correcting means corrects said unoccupied-seat reference value through the use of a plurality of load detection values taken in time series.